

REMARKS/ARGUMENTS

Favorable reconsideration of this application, as presently amended and in light of the following discussion, is respectfully requested.

Claims 1-21, 23-38, and 40-53 are pending in the present application. Claims 9 and 26 are amended, and support for amended Claims 9 and 26 is found in the Applicants' specification at least at page 50, line 4 to page 52, line 1.¹ Claims 43-53 are newly added and correspond to dependent Claims 21, 23, 24, 32-36, 38, 40, and 41 rewritten in independent form. It is respectfully submitted that no new matter is added by this amendment.

The specification is amended to correct typographical errors and minor informalities. It is respectfully submitted that no new matter is added.

In the outstanding Office Action, Claims 9, 14, 26, and 31 were rejected under 35 U.S.C. § 103(a) as unpatentable over Eklund et al. (U.S. Pat. No. 6,175,717; hereafter Eklund) in view of Hotomi et al. (U.S. Patent No. 5,027,157; hereafter Hotomi); Claims 10, 25, 27 and 42 were rejected under 35 U.S.C. § 103(a) as unpatentable over Eklund in view of Hotomi as applied to Claims 9 and 26 above, and further in view of Badesha et al. (U.S. Pat. No. 5,848,327; hereafter Badesha); Claims 10-13 and 27-30 were rejected under 35 U.S.C. § 103(a) as unpatentable over Eklund in view of Hotomi as applied to Claims 9 and 26 above, and further in view of Parker (U.S. Pat. No. 5,729,807) and Badesha; Claims 20 and 37 were rejected under 35 U.S.C. § 103(a) as unpatentable over Eklund in view of Hotomi as applied to Claims 9 and 26 above and further in view of Lestrangle (U.S. Pat. No. 6,219,515); Claims 22 and 39 were rejected under 35 U.S.C. § 103 (a) as unpatentable over Eklund in view of Hotomi as applied to Claims 9 and 26 above and further in view of Hosoya et al. (U.S. Pat. No. 4,598,991; hereafter Hosoya); Claims 15-19, 21, 23, 24, 32-36, 38, 40, and 41 were objected to as being dependent upon a rejected base claim, but were indicated as allowable if

¹ Additional support is found in the Applicants' specification at page 22, lines 3-7; page 23, line 10; page 50, lines 4-21; and Figure 10.

rewritten in independent form to include all limitations of the base claim and any intervening claims; and Claims 1-8 were indicated as allowed.

Applicants thank Examiner Brase for the personal interview granted Applicants' representatives on January 31, 2005. During the interview, proposed amendments to Claims 9 and 26 adding the feature, "wherein a charge potential of the surface of the photosensitive body is | 200 | V or less" were discussed with respect to the prior art of record. Examiner Brase indicated the added feature is not contained in the prior art of record, but that the added feature would require further search and consideration, and therefore the claims amendments should be filed concurrently with a Request for Continued Examination (RCE).

Applicants also acknowledge with appreciation the indication that Claims 1-8 are allowed and the indication of allowable subject matter in Claims 15-19, 21, 23, 24, 32-36, 38, 40, and 41. New independent Claims 43-53 correspond to dependent Claims 21, 23, 24, 32-36, 38, 40, and 41 rewritten in independent form including all the limitations of their base claim and any intervening claims. Therefore, it is respectfully submitted that new Claims 43-53 are in condition for formal allowance.

With regard to the prior art rejections of independent Claims 9 and 26 under 35 U.S.C. §103(a), the rejection is respectfully traversed as follows.

The invention of Claims 9 and 26 relate to a development device and image forming apparatus including an electrostatic transportation device that moves fine particles, "wherein a width of each of the electrodes in a traveling direction of the fine particles is set to be in a range of 1 time to 20 times an average particle diameter of the fine particles, a pitch between the electrodes in the traveling direction of the fine particles is set to be in a range of 1 time to 20 times the average particle diameter of the fine particles." The inventors studied electrostatic transportation devices and found through their own inventive efforts that stable

transportation of toner particles can be achieved by matching the toner and the charging member in the apparatus since the toner particles differ in size and shape.

The transporting efficiency and hopping efficiency of the development device is highly dependent on the electrode width L and electrode interval R illustrated in the non-limiting example of Figure 1.² When the electrode width L is wide, the number of toner particles riding on the electrode increases and the number of toner particles moving over a large distance increases, which results in increased transporting efficiency. However, if the electrode width L becomes too wide the field intensity in the vicinity of the center of the electrode lowers and the toner particles adhere to the electrode, and the transporting efficiency is lowered.³ The electrode interval R determines the field intensity between the electrodes based on a relationship between the distance and the voltage applied to the electrode. As interval R becomes smaller, the field intensity increases, and therefore, the initial speeds of transporting and hopping are easily obtained. However, in this situation the movement distance per time for one particle moving from one electrode to another electrode becomes short. Therefore, unless the driving frequency is high, the moving efficiency does not improve.⁴ Non-limiting Figures 6 and 7, illustrate the inventors own inventive efforts in determining the dependency of the transporting efficiency and hopping efficiency on the electrode width L and electrode interval R. As a result of these inventive efforts, the inventors determined, as recited in Claims 9 and 26, that if “a width of each of the electrodes in a traveling direction of the fine particles is set to be in a range of 1 time to 20 times an average particle diameter of the fine particles, a pitch between the electrodes in the traveling direction of the fine particles is set to be in a range of 1 time to 20 times the average particle

² Applicants' specification, page 15, lines 1-10.

³ Applicants' specification, page 15, line 16 to page 16, line3.

⁴ Applicants' specification, page 16, lines 6-15.

diameter of the fine particle,” then transporting and hopping can be stably performed with an efficiently low voltage.⁵

Further, amended Claims 9 and 26 recite a development device and image forming apparatus, respectively, “wherein a charge potential of the surface of the photosensitive body is | 200 | V or less.” According to the structure recited in amended Claims 9 and 26, even when a voltage applied between the electrodes is a low voltage, the electric field generated becomes large. Therefore, the toner particles adhering on the surface of the electrodes can easily be released. A non-limiting example recited in the Applicants’ specification at page 51, lines 4-14, recites a surface potential of -170 Volts.⁶ Accordingly, a high voltage bias of 500 Volts to several Kilovolts is not required to be applied between the developing roller and the photosensitive body in order to release toner.⁷ Further, the amount of ozone or NO_x generated when a photosensitive body is charged can be reduced which is advantageous in overcoming environmental problems and increasing the durability of the photosensitive body.⁸

Ecklund discloses an integrated toner transportation/toner charging device with a 75 μm wide electrodes separated by a distance of 75 μm and is directed to overcoming difficulties resulting from the pigment of the toner and uniform delivery of the toner to the development zone using a fluidized bed.⁹ However, Ecklund does not disclose a photosensitive body, “wherein a charge potential of the surface of the photosensitive body is | 200 | V or less.” In fact, Ecklund discloses that “the image area has a uniform potential of about -500 volts.”¹⁰ Hotomi discloses a developing device with electrodes for inducing a traveling wave on the developing material, and discloses several embodiments of transporting

⁵ Applicants’ specification, page 20, line 9 to page 21, line 21.

⁶ Applicants’ specification, page 51, lines 4-14.

⁷ Applicants’ specification, page 50, lines 22-25

⁸ Applicants’ specification, page 65, lines 19-23.

⁹ Ecklund, column 8, lines 5-46.

¹⁰ Ecklund, column 4, lines 57-58.

toner particles with a particle size of 13 μm using a traveling wave. However, like Ecklund, Hotomi does not disclose a photosensitive body, “wherein a charge potential of the surface of the photosensitive body is | 200 | V or less.” In Hotomi, test example 7 discloses a DC voltage of 500 V applied to the conductive rubber roller.¹¹ Therefore, Hotomi does not cure the deficiencies discussed above with respect to Ecklund. Therefore, neither Ecklund nor Hotomi, either alone or in any proper combination, teach or suggest a photosensitive body, “wherein a charge potential of the surface of the photosensitive body is | 200 | V or less,” as recited in amended Claims 9 and 26.

Further, none of the other cited references cure the deficiencies discussed above with respect to cited references Ecklund and Hotomi. More specifically, Badesha discloses a DC bias voltage “which applies approximately 300 volts to the donor roller;”¹² Parker discloses a “DC bias of approximately -400 volts is applied to the development structure;”¹³ and Hosoya discloses a static latent image plus-charged to “300-800 V.”¹⁴ Lestrange does not disclose a DC voltage applied to the surface of the photosensitive body. Therefore, it is respectfully submitted that none of the cited references, either alone or in any proper combination, teach or suggest a photosensitive body, “wherein a charge potential of the surface of the photosensitive body is | 200 | V or less,” as recited in amended Claims 9 and 26. Therefore it is respectfully requested that the rejection to Claims 9 and 26 under 35 U.S.C. § 103(a) be withdrawn. Likewise, it is respectfully requested that Claims 10-21, 23-25, 27-38, and 40-42 that depend from parent Claims 9 and 26 are allowable for at least the reasons discussed above with respect to parent Claims 9 and 26.

Further, the dependency of the transportation and hopping efficiency of an electrostatic transportation device is not obvious to one of ordinary skill in the art absent

¹¹ Hotomi, column 21, lines 42-45.

¹² Badesha, column 6, lines 23-24.

¹³ Parker, column 6, lines 42-43.

¹⁴ Hosoya, column 2, line 59.

hindsight reconstruction using the Applicants' inventive efforts. Ecklund discloses an integrated toner transportation/toner charging device with a 75 μm wide electrodes separated by a distance of 75 μm , but does not mention the dependency of the transportation and hopping efficiency on the electrode width and distance between the electrodes. Hotomi discloses several embodiments of transporting toner particles with a particle size of 13 μm using a traveling wave. However, like Ecklund, Hotomi does not recognize or mention the dependency of the transportation and hopping efficiency on the electrode width and distance between the electrodes. Further, none of the other cited references of Badesha, Parker, Hosoya, or Lestrangle mention the dependency of the transportation and hopping efficiency on the electrode width and distance between the electrodes.

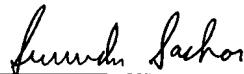
It is noted that the reviewing court for the PTO has recently re-emphasized that a core factual finding in a determination of patentability cannot be based on conclusions as to what would be basic knowledge in the art, instead, concrete evidence must be produced. See In re Zurko, 59 USPQ2d 1693, 1697-98 (Fed. Cir. 2001). As further recently noted by the PTO reviewing court, the "case law makes clear that the best defense against the subtle but powerful attraction of a hindsight-based obviousness analysis is rigorous application of the requirement for a showing of the teaching or motivation '[to combine]' as an 'essential evidentiary component of a obviousness holding.'" In re Dembicza, 50 USPQ2d 1614, 1617 (Fed. Cir. 1999).

Accordingly, if the PTO continues to allege obviousness, it is respectfully submitted that it must abide by precedent and provide evidence of the various unsupported allegations presently relied upon. Absent the production of the above-noted concrete evidence, the case law requires the withdrawal of this rejection.

Consequently, in view of the present amendment and in light of the above comments, no further issues are believed to be outstanding in this application, and the present application is believed to be in condition for formal allowance. An early and favorable action to that effect is respectfully requested.

Respectfully submitted,

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